Proposed Amendment between California Energy Commission and The Regents of the University of California, Davis

Title: Realizing Energy Efficient Lighting in California
Amount: $311,481.00
Term: 10 months
Contact: Dustin Davis
Committee Meeting: 1/6/2011

Funding

FY	Program	Area	Initiative	Budget	This Project	Remaining Balance	
09	Electric	Buildings	Technology Innovations	$10,900,000	$125,000	$0	0%
09	Electric	Buildings	Standards and Policy Coordinations	$2,434,200	$186,481	$79,242	3%

Recommendation

Approve this agreement with UC Davis for $311,481.00. Staff recommends placing this item on the discussion agenda of the Commission Business Meeting.

Issue

This amendment is to:
a) Extend the contract term by 10 months to add two sub-tasks totaling $311,481.00:
1) Develop Smart Corridor Lighting Systems for Commercial and Industrial Applications and
2) Conduct a thorough literature search and define metrics in support of establishing a 2007 California Lighting Energy Use Baseline to address AB1109 goals.
b) Eliminate three sub-tasks in the original agreement and re-scope four other subtasks based on feedback from the Program Advisory Committee (PAC).
c) Amend the contract to correct the fringe, and general and administrative (G&A) rates.

Background

This agreement was originally approved in June 2009. Since that time, a few sub-tasks have been recognized as non beneficial and incorrect rates were found in the budget. This amendment will resolve these issues:

a) Redistribute part of funds from eliminated sub-tasks to two new sub-tasks and redistribute the remaining balance of the funding to other existing sub-tasks which is a result of the PAC meeting. The following are the descriptions of the two new sub-tasks:

1) Development and Demonstration of Smart Corridor Lighting Systems for Commercial and Industrial Applications (new sub-task). This sub-task addresses an area that is ripe for significant energy savings potential. CLTC conducted a survey of energy use across the UC Davis campus. Lighting energy demand and consumption data was collected by application, in order to identify major energy consuming areas and opportunities for deep energy savings. Surprisingly, surveys found unassigned spaces such as corridors, stairwells, storage rooms, and maintenance closets to be the largest lighting energy consumer on campus. These results lead to a dramatic paradigm shift in how to deal with demand response. Traditionally, primary occupancy spaces such as personal office spaces, break rooms, and conference rooms were subjected to electric lighting load shed during critical demand response events. To complete this work CLTC must conduct research to develop a demand responsive design for corridors and hallways and demonstrate and evaluate the technical and economic feasibility of the technology while including safety considerations. The demonstration will occur in investor owned utilities (IOUs) service territory facilities and if successful, could be the focus of future utility incentive programs. The total cost of the research is $456,939. Of this amount $51,939 will be from the original sub-tasks with $250,000 being requested in this amendment and the remaining $155,000 from IOUs.

2) 2007 Lighting Energy Baseline Determination (new sub-task). In 2007 California approved Assembly Bill (AB) 1109, requiring the implementation of regulation "structured to reduce average statewide electrical energy consumption by not less than 50% from the 2007 levels for indoor residential lighting and not less than 25% from the 2007 levels for indoor commercial and outdoor lighting by 2018." AB 1109 implementation requires determination of the 2007 lighting energy baseline, using metrics that will facilitate the development of regulations and monitoring of progress for each of the commercial, residential and industrial sector. Research is needed to determine the metrics for the 2007 baseline. The total cost for this research is $61,481 and PIER is providing all of the funding.

b) Eliminate three sub-tasks. Due to concerns from the PAC in August 2010, three sub-tasks are proposed to be eliminated. Specifically, sub-tasks dedicated to software development based on the proposed National Electrical Manufacturers Association (NEMA) Digital Lighting Controls standard; longevity testing of LED and induction luminaires; and evaluation of scotopic lighting issues are removed from the agreement. The open NEMA standard was never formally adopted and industry has moved towards private software development based on proprietary control protocols rendering the Digital Lighting Controls project obsolete. LED/Induction Longevity Testing would not provide any new data, and this project is being pursued by industry, in a more rigorous fashion. The evaluation of scotopic light effects is being handled by other research groups and the California Lighting Technology Center (CLTC) work would be duplicative. The elimination of these sub-tasks results in unallocated funds of $349,126.

c) Fix typographical errors in attachment B-4 of the budget to reflect the correct fringe and G&A rates. This was only recently brought to the forefront due to limited billing information provided by Universities. Original rate in agreement for General & Administrative is 16% and the correct rate should be 23%. Original rate in agreement for Fringe benefits is 10% and the correct rate should be 29%.

Proposed Work

1) Development and Demonstration of Smart Corridor Lighting Systems for Commercial and Industrial Applications. CLTC proposes to initiate an adaptive, demand responsive design for target areas with no occupant ownership (e.g. - corridors, bathrooms, storage areas). By shifting load shed priorities to these spaces, CLTC expects an increase in energy savings and user acceptance of demand load reductions.

CLTC will accomplish this research through laboratory development and evaluation activities and field demonstrations in each of the major IOU service territories. Initial investigations will identify system solutions that offer the most cost-effective, energy saving alternative. Multiple solutions may be developed based on the application. For example, a solution for the hospitality industry may be different than one designed for an industrial application. Following system design, prototype systems will be developed at CLTC, and tested for electrical and photometric performance. This work is expected to be conducted in collaboration with industry partners, such as Philips and other lighting and controls manufacturers, so that following successful development and demonstration, the technology can be commercialized and yield immediate energy savings benefits for California.

2) 2007 Lighting Energy Baseline Determination (new sub-task). The CLTC will create a framework for characterizing commercial, residential, and outdoor lighting for California. This framework will be used to identify opportunities in the state for building code improvements, appliance regulations, compliance, outreach, and future PIER studies. This framework will be developed through a literature search and interactions with Energy Commission staff, lighting design experts, utilities, and lighting manufacturers which will result in defining the metrics to support establishment of the 2007 California lighting baseline. The research will consolidate numerous lighting studies and evaluate the potential for a comprehensive lighting road-map that will be used to meet the goals of AB 1109. This research is supported by the Efficiency and Renewable Energy Division, and the Appliances and Process Energy Office. The results will be used by that division to determine the need for future standards to meet the goals of AB 1109.

3) Adjustments to the budget and/or scope of work of other sub-tasks are due to recommendations from the PAC.

Justification and Goals

This project "[will develop, and help bring to market] increased energy efficiency in buildings, appliances, lighting, and other applications beyond applicable standards, and that benefit electric utility customers" (Public Resources Code 25620.1.(b)(2)), (Chapter 512, Statues of 2006)).

These projects are also consistent with the Integrated Energy Policy Report and the CPUC's Energy Efficiency Strategic Plan which specifically identifies the need for lighting research to meet the state's policy goals for energy efficiency.

This will be accomplished by:

- Developing and demonstrating an adaptive lighting system for use in commercial and industrial building corridors that result in energy savings while maintaining occupant satisfaction.

- Establishing the metrics for determining the 2007 lighting energy baseline. This will lead to a potential lighting road-map not funded by this project which will identify the need for future regulations (Title 20 and Title 24) and monitoring of progress for the residential, commercial and industrial sector to reduce average statewide electrical energy consumption to levels stated in AB 1109.